Biological Evaluation
Grayson County Broadband Project
Mount Rogers National Recreation Area
September 2021

INTRODUCTION

This Biological Evaluation (BE) summarizes and documents the process and makes determinations regarding the effects on species listed by the Regional Forester as Proposed, Endangered, Threatened, or Sensitive (PETS) Species of the George Washington and Jefferson National Forests for the proposed project area. The Endangered Species Act of 1973 requires that Federal agencies not jeopardize or adversely modify critical habitat of federally listed species. This BE is prepared in compliance with policy outlined in Forest Service Manual (FSM) 2670.31. A BE is required of all proposed Forest Service activities that have the potential to affect PETS species.

The objectives of this Biological Evaluation (BE) are to:

1. Determine the effects of the proposed action on PETS species and their habitats that may occur within the project area.
2. Provide biological input to ensure that the USDA Forest Service is compliant with the FSM 2670.31, FSH 2609.13, and the Endangered Species Act (ESA).
3. Reiterate management requirements utilized during project implementation to minimize or avoid potential effects to Federally-listed species or their habitats.
4. Adhere to the Forest Plan implementation requirement of a site-specific biological assessment for a project area.

This BE was prepared in accordance with the Forest Service Handbook 2609.13 and regulations set forth in Section 7 (a) (2) of the Endangered Species Act.

PURPOSE AND NEED

In coordination with the Commonwealth of Virginia and Grayson County, Appalachian Power Company (APCo), d.b.a. Appalachian Electric Power, is proposing to install fiber-optic cable on existing distribution power poles for the Volney to Fairwood Rural Broadband Project. This is the second part of a three-part project to provide high-speed broadband internet service to all of Grayson County. Grayson County was identified by the General Assembly as one of the least connected in Virginia.

PROPOSED ACTION AND AFFECTED AREA

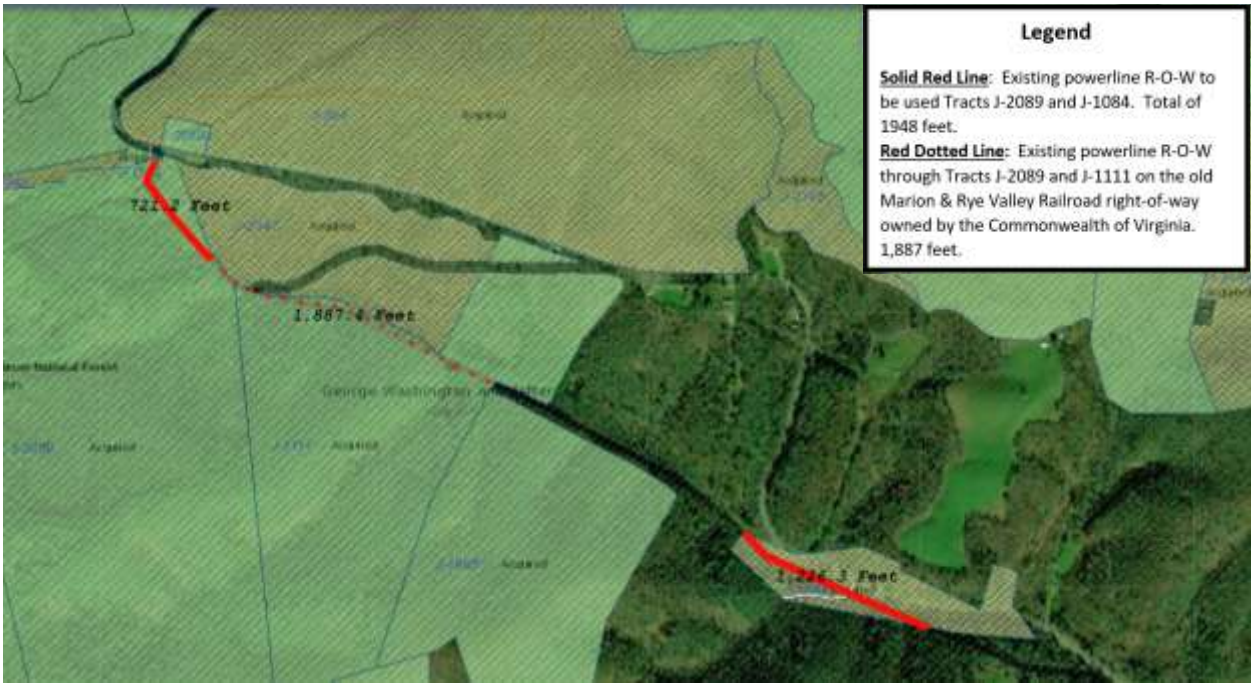
APCo proposes to install new fiber-optic cable on existing distribution power poles for the Volney to Fairwood Rural Broadband Project (Figure 1). The line will be installed on existing APCo owned electric distribution poles and strung within the existing 40’ wide right-of-way on easements secured prior to the National Forest acquiring the properties. Two National Forest Tracts will be additionally encumbered for a total length of approximately 1,950 feet or 0.37 miles. Tract J-2089 has approximately 721’ of right-of-way and Tract J-1084 contains the remaining 1,226’. There are five existing poles on Tract J-2089 and a maximum of 3 poles on J-1084. While the power line right-of-way passes through Tract J-1111 for approximately 1,887 feet, the depiction on the accompanying map as being National Forest land is a

mapping error. The powerline crosses this tract wholly within the 60' wide corridor of the abandoned Marion & Rye Valley/Virginia Southern Railroad that is owned by the Commonwealth of Virginia. This abandoned railroad right-of-way was excepted from the deed for this tract at the time of National Forest acquisition.

One bundle of fiber optic cable will be installed by connecting it to the existing powerline poles approximately 12 inches below the existing neutral wire. Installation will occur by either bucket truck (where accessible) or manually climbing the individual poles. A maximum of 8 poles occur on National Forest land. Access is provided at the north end of the project by Highway 16/State Route 741 Homestead Road. Access is provided to Tract J-1084 along a jointly owned driveway that follows the old railroad grade and provides access to J-1084 and the adjoining private land through a deeded easement. A maximum of 5 poles will be accessible by bucket truck. The remaining poles will be manually climbed. UTV's may be used in the accessible portion of the r-o-w. Areas inaccessible by UTV will be accessed on foot. No additional access was requested for this project. No ground disturbance is anticipated. Some minor brush clearing will likely occur to facilitate the installation and stretching of the cable. The existing powerline right-of-way is 40' and is relatively clear of brush underneath the wires. Evidence of past tree cutting/trimming is present as numerous small brush piles along the right-of-way. Brush clearing and tree trimming is recorded in APCo's pre-existing deeds and does not require additional authorization.

A long-term Special Use Authorization to install, operate and maintain the fiber optic cable along a 10' wide corridor within the existing 40' wide powerline corridor will be issued.

Figure 1. Project Map



METHODS USED

Analysis of the project was conducted using the best available science, including references from science-based websites, books, papers, reports, state and federal databases, field surveys, and professional

opinions. Using information from field visits, project area habitat conditions, species habitat requirements, species distributions, and limiting factors, the George Washington Jefferson OAR table was reviewed to determine if any sensitive species were likely to occur in the project area (Appendix A). This BE addresses PETS species that are considered to occur or have habitat on the Mount Rogers National Recreation Area.

DETERMINATION OF EFFECTS

There would be **no effects** and **no impacts** to any PETS species resulting from the implementation of this project. Much of this project is located on land that is not owned by the forest service therefore those sections do not need to be evaluated by the forest service. Less than 10 poles are located on forest service land. The only reason NEPA is needed for the project is because fiber optic cable is not covered under the current the ROW for the power line. All actions proposed for this project are actions that normally take place in the current ROW. These actions are just not approved for this type of cable.

The fiber optic cable would be attached to existing power poles by bucket truck if accessible or by climbing if not, and all operations would be conducted within the existing ROW (40 feet) with Appalachian Power. The new ROW for the fiber optic line will be 10 feet wide, well within the existing ROW for the powerline. There would be no need for tree trimming or ground disturbance. Just minor brush cutting that is consistent with the power line ROW.

The ROW for the powerline is maintained with both mechanical and chemical treatments. These activities keep the power line clear of tree limbs and brush. These activities have been conducted within the past few years, reducing the likelihood of their being sensitive plants in the area.

Because no ground disturbance or tree trimming would take place and brush trimming is consistent with Appalachian Power's current ROW for the power line, there would be **no effects** and **no impacts** to PETS species. These types of activities already occur regularly at the sites and would not affect or alter habitat conditions in the project area. With the exception of adding the fiber optic line to the existing power pole, no new actions would take place at the project site.

SIGNATURES: If modifications are made in the Grayson County Broadband Project, or if additional information regarding the effects of the project on TES becomes available, the USFWS will be notified, and their review will be reinitiated if the USFS determines it is needed.

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/s/ *Brittany B. Phillips 09/13/2021*

Wildlife Biologist

APPENDIX A

OAR Step Down Process

A "step down" process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this step-down analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species' ranges on the Forest are based on county records contained in such documents as the "Atlas of the Virginia Flora," but are further refined when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times, range information clearly indicates a species will not occur in the project area due to the restricted geographic distribution of most TES species. When the project area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code "1" in the Appendix A table.

From past field surveys and knowledge of the area, and given the proposed action, those species which are analyzed and discussed further in this document are those that: a) are found to be located in the activity areas (OAR code "5"); b) were not seen during the survey(s), but possibly occur in the activity areas based on habitat observed during the survey(s) or field survey was not conducted when species is recognizable (OAR code "6"); c) for aquatic species, they are known or suspected downstream of project or activity areas and within identified geographic bounds of water resource cumulative effects analysis area (OAR code "8") and d) federally listed mussel and/or fish species known in 6th level watershed of project areas. Conservation measures from USFWS/FS Conservation Plan applied (OAR code "9").

More information on those species can be found in the determination table and species affected tables in the main body of this document. Because there would no impacts or effects on PETS species in the project area. Species that have the potential to be in the project area are given a OAR code of 11. Please see the determinations write up for this justification.

Documentation of Threatened, Endangered or Sensitive Species Occurrences for Grayson County Broadband Project
Coding for Occurrence Analysis Results (OAR) for 199 Species

Forest updated April 30, 2020 (based on Region 8 Sensitive species list effective March 15, 2018)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
1	-	X	*Ammocrypta clara*	Western sand darter	Clinch R, Powell R	Aquatic-rivers.	S	G3	S1	-
1	-	X	*Chrosomus cumberlandensis*	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
1	-	X	*Erimonax monachus*	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
1	-	X	*Erimystax cahni*	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
1	-	X	*Erimystax insignis*	Blotched chub	Clinch-Powell system, S Fk Holston R	Aquatic-streams/rivers.	S	G4	S3	-
1	-	X	*Etheostoma acuticeps*	Sharphead darter	S and Middle Fk Holston R	Aquatic-rivers.	S	G3	S1	-
1	-	X	*Etheostoma cinereum*	Ashy Darter	Upper Clinch R, Guest R gorge	Aquatic-rivers.	S	G2G3	S1	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
7	-	X	*Etheostoma osburni*	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S1
1	-	X	*Etheostoma percnurum*	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Etheostoma denoncourti*	Golden darter	Four sites Clinch R, lower Copper Ck.	Aquatic-rivers. Formerly: Tippecanoe darter, *Etheostoma tippecanoe.*	S	G3G4	S1	S2
1	-	X	*Etheostoma vulneratum*	Wounded darter	N & S Fk Holston R, Clinch R, Powell R.	Aquatic-Rivers.	S	G3	S2S3	-
1	-	X	*Icthyomyzon greeleyi*	Mountain brook lamprey	M, N Fk Holston R, Copper Ck, Indian Ck, Clinch R, Powell R	Aquatic-rivers.	S	G3G4	S2	S1
1	-	X	*Notropis ariommus*	Popeye shiner	N Fk Holston R, Clinch R, Powell R	Aquatic-rivers.	S	G3	S2S3	S2
1	X	X	*Notropis semperasper*	Roughhead shiner	Upper James R watershed above Buchanan (Cowpasture R, Jackson R, Craig Ck)	Aquatic-rivers.	S	G2G3	S2S3	-
1	-	X	*Noturus flavipinnis*	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
1	X	X	*Noturus gilberti*	Orangefin madtom	S Fk Roanoke R watershed, Roanoke R above Salem, Craig Ck, Johns Ck, Cowpasture R	Aquatic-streams.	S	G2	S2	-
1	-	X	*Percina burtoni*	Blotchside logperch	N Fk Holston R, Clinch R, Copper Ck, Little R	Aquatic-rivers.	S	G2G3	S1	-
1	-	X	Percina rex	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
1	-	X	*Percina williamsi*	Sickle darter	S & N Fk Holston R above Saltville, Clinch R - lower Copper Ck.	Aquatic-rivers. Formerly: *Percina macrocephala*.	S	G2	S1S2	S2
7	-	X	*Phenacobius teretulus*	Kanawha minnow	Upper New R watershed	Aquatic-streams.	S	G3G4	S2S3	S1
Amphibian										
1	-	X	*Aneides aeneus*	Green salamander	Bland, Dickenson (Skegg Boulderfield), Lee, Russell, Scott, Tazewell, Washington, Wise, Wythe Cos VA; Greenbrier, Monroe, Pendleton Cos WV	Damp (not wet) crevices in shaded rock outcrops and ledges; beneath loose bark; in cracks of standing or fallen trees; in or under logs on ground.	S	G3G4	S3	S3
1	-	X	*Cryptobranchus alleganiensis*	Hellbender	N & S Fk Holston (Whitetop Laurel), Clinch R, Copper Ck, Powell R.	Aquatic-rivers, streams.	S	G3G4	S2S3	S2
1	-	X	*Desmognathus organi*	Northern pygmy salamander	Grayson, Smyth, Washington Cos. Whitetop Mt. and Mt. Rogers	Spruce-fir forests and adjacent northern hardwoods, >3600'	S	G3	S2	-
1	-	X	*Plethodon hubrichti*	Peaks of Otter salamander	Peaks of Otter, Apple Orchard Mtn	Mixed oak, late successional with loose rocks and logs, >1800'.	S	G2	S2	-
1	X	-	*Plethodon punctatus*	Cow Knob salamander	Shenandoah Mtn, VA & WV	Mixed oak, late successional with loose rocks and logs, >2500'.	S	G3	S2	S1
1	X	-	*Plethodon sherando*	Big Levels salamander	Big Levels, Augusta Co	Forest and rocky talas slopes 1900' – 3580'.	S	G2	S2	-
1	X	-	*Plethodon virginia*	Shenandoah Mountain salamander	Rockingham Co	Temperate forests between 3600' – 3900'.	S	G2G3	S2	SNR
1	-	X	*Plethodon welleri*	Weller's salamander	Mt Rogers & Whitetop Mtn	Spruce-fir forests and adjacent northern hardwoods.	S	G3	S2	-
Reptile										
1	X	-	*Clemmys guttata*	Spotted turtle	Maple Flats, Augusta Co VA; Wardensville area, Hardy Co., WV	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation; small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins.	S	G5	S4	S1
1	X	-	*Glyptemys insculpta*	Wood turtle	Page, Rockingham, Shenandoah Cos; N Shenandoah R watershed	Along permanent streams during much of year; in summer may roam widely overland; variety of terrestrial habitats adjacent to streams, including deciduous woods, cultivated fields, and woodland bogs, marshy fields and pastures. Overwinters in streams.	S	G3	S2	S3
1	X	X	*Pituophis melanoleucus*	Pinesnake	Historic records from Alleghany, Augusta, Botetourt, Craig, Rockingham Cos., VA: Monroe Co, WV. No current records known from GWJNF.	Xeric, pine-dominated or pine-oak woodland with open, low understory established on sandy soils; require forest openings, with level, well-drained sandy soils and little shrub cover as nesting/hibernation sites.	S	G4	S1?	SH
Bird										
1	-	X	*Centronyx henslowii*	Henslow's Sparrow	Pulaski Co (Radford Arsenal). No nest records known on GWJNF.	Open fields, meadows with grass interspersed with weeds or shrubby vegetation, especially in damp or low-lying areas; un-mowed hayfields. Formerly: *Ammodramus henslowii.*	S	G4	S1B	S1B
Mammal										
1	-	-	*Corynorhinus rafinesquii*	Rafinesque's big-eared bat	Has not been found in VA but has occurred nearby in WV, KY, & TN. In 1978, a large nursery colony was found in Hancock Co., TN, very close to the VA-TN border. Only possible in Lee, Scott, Washington Co.	Caves in winter, large hollow trees summer, may also use cliff-lines, buildings, and bridges in summer. Not on VADCR-NHP "Rare Animal" list.	S	G3G4	-	S1
1	X	X	*Corynorhinus townsendii virginianus*	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. No occupied caves currently known on Forest.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
1	-	X	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	-	*Glaucomys sabrinus fuscus*	Virginia northern flying squirrel	Laurel Fork area, Highland Co	Spruce forests and adjacent northern hardwoods.	S	G5T2	S1	S2
1	-	X	*Myotis grisescens*	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
11	X	X	*Myotis leibii*	Eastern small-footed bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in caves during winter, roosts in crevices of large rock outcrops, cliffs, and under large rocks in talus & boulder-fields during summer, plus similar man-made structures like rip-rap and bridges, forages widely in all forested and open habitat types over both ridges and valleys.	S	G1G3	S2	S1
11	X	X	*Myotis septentrionalis*	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S1S3	S1S2
11	X	X	*Myotis sodalis*	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
11	X	X	*Perimyotis subflavus*	Tricolored bat	Every county in VA, WV, KY	Caves in winter: Caves, trees, cliffs, barns during summer months. Decline due to WNS. Formerly: Eastern pipistrelle, *Pipistrellus subflavus*.	S	G2G3	S1S3	S2
INVERTEBRATE										
Snail (Mollusk, Class Gastropoda)										
1	X	-	*Fontigens tartarea*	Organ cavesnail	Rock Camp Cave (1 mile from FS), McClung-Zenith Cave (1.5 mile from FS), Monroe Co, WV; Greenbrier, Pocahontas, Randolph, Tucker Cos, WV; Bath, Highland Cos, VA	Caves. Obligate troglobite.	S	G2	S1S2	S2
1	-	-	*Gastrodonta fonticula*	Appalachia bellytooth	No known records on GWJ. Scott and Wise Co records need to be verified.	Damp, wooded environments, particularly in deep piles of wet leaf litter and around rotting wood debris.	S	G3G4	S1S3	S2
1	X	X	*Glyphyalinia raderi*	Maryland glyph	Alleghany, Montgomery Cos	Calciphile, edge of seeps within leaf litter. May burrow.	S	G2	S1S2	SH
1	X	-	*Helicodiscus diadema*	Shaggy coil	Alleghany Co	Calciphile; semi-open, calcium-rich environments, especially limestone rubble/talus and thinly wooded limestone hills.	S	G1	S1	-
1	X	X	*Helicodiscus triodus*	Talus coil	Alleghany, Botetourt, Rockbridge Cos	Calciphile, limestone rubble on wooded hillsides and near cave entrances.	S	G2	S1S2	SH
1	-	X	*Io fluvialis*	Spiny riversnail	Clinch R, N Fk Holston R	Aquatic-rivers.	S	G2	S2	-
1	-	-	*Paravitrea septadens*	Brown supercoil	Breaks Interstate Park, Dickenson Co; Buchanan Co., VA. No known records on GWJ.	Steep forested slopes and in ravines, often among woody debris, rocks, or deeper leaf litter; mixed eastern hemlock-hardwood forest, also in richer hardwood stands.	S	G1	S1	-
1	-	-	*Stenotrema altispira*	Highland slitmouth	No known records on GWJ. Grayson and Smyth Co records need to be verified.	Higher elevations, in leaf litter and woody debris.	S	G3	S1	-
1	-	-	*Ventridens decussatus*	Crossed dome	No known records on GWJ. Scott Co records need to be verified.	High elevations, usually >3000', in leaf litter, particularly oak leaves.	S	G3	SU	-
1	-	-	*Vertigo bollesiana*	Delicate vertigo	No known records on GWJ. VA and WV records need to be verified.	Leaf litter often under shrubs, on cliff-face ledges and boulder tops in mesic upland forest, and damp microsites in northern white cedar wetlands.	S	G4	SU	-
1	X	-	*Vertigo clappi*	Cupped vertigo	Greenbrier & Pendelton Cos, WV	Well-rotted, humid leaf litter and fine soil on shaded boulders, talus, ledges, and bases of forested lime-rich bedrock outcrops.	S	G1G2	S1S2	SH
Mussel (Mollusk, Class Bivalvia)										
7	-	X	*Alasmidonta marginata*	Elktoe	Greenbrier R & New R, WV. Upper New R; Reed Creek; Sinking Creek (Giles Co.); Wolf Creek (Bland Co.); upper S Fk Holston; historical Upper Clinch.	Aquatic-rivers.	S	G4	S1S2	S2
1	X	-	*Alasmidonta varicosa*	Brook floater	Potomac drainage	Aquatic-rivers.	S	G3	S1	S2
1	-	X	*Alasmidonta viridis*	Slippershell mussel	Historic in Upper Clinch R excluding Copper Creek where extant; Upper S Fk Holston	Aquatic-rivers.	S	G4G5	S1	-
1	-	X	*Cumberlandia monodonta*	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
1	-	X	*Cyprogenia stegaria*	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
1	-	X	*Dromus dromas*	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Elliptio lanceolata*	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
1	-	X	*Epioblasma brevidens*	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma capsaeformis*	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma florentina aureola*	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
1	-	X	*Epioblasma torulosa gubernaculum*	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-
1	-	X	*Epioblasma triquetra*	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
1	-	X	*Fusconaia cor*	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	-	X	*Fusconaia cuneolus*	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Fusconaia masoni*	Atlantic pigtoe	Roanoke R, Craig Ck drainage	Aquatic-rivers.	PT	G2	S2	-
1	-	X	*Hemistena lata*	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Lampsilis abrupta*	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
1	X	-	*Lampsilis cariosa*	Yellow lampmussel	N Fk Shenandoah R; Shenandoah, Warren Cos.	Aquatic-rivers.	S	G3G4	S2	S2
1	-	X	*Lasmigona holstonia*	Tennessee heelsplitter	Upper Clinch, N and M Fk Holston R drainages; Wolf Ck, Bland Co below Burkes Garden	Aquatic-streams.	S	G3	S1	-
7	X	-	*Lasmigona subviridis*	Green floater	Widely distributed in N & S Fk Shenandoah R, Pedlar R, James R	Aquatic-rivers.	S	G3	S2	S2
1	-	X	*Lemiox rimosus*	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Parvaspina collina*	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: *Pleurobema collina*.	E	G1	S1	S1
1	-	X	*Pegias fabula*	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
1	-	X	*Plethobasus cyphyus*	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S2
1	-	X	*Pleurobema cordatum*	Ohio pigtoe	Clinch R	Aquatic-rivers.	S	G4	S1	S2
1	-	X	*Pleurobema oviforme*	Tennessee clubshell	Clinch R, Powell R, N, Middle, S Fk Holston R	Aquatic-streams.	S	G2G3	S2S3	-
1	-	X	*Pleurobema plenum*	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
1	-	X	*Pleurobema rubrum*	Pyramid pigtoe	Upper Clinch R	Aquatic-rivers.	S	G2G3	SH	-
1	-	X	***Pleuronaia barnesiana***	Tennessee pigtoe	Clinch R, Powell R, N Middle, S Fk Holston R	Aquatic-rivers.	S	G2G3	S2	-
1	-	X	*Pleuronaia dolabelloides*	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
1	-	X	*Ptychobranchus subtentum*	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA; Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
1	-	X	*Quadrula cylindrica strigillata*	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
1	-	X	*Quadrula intermedia*	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Quadrula sparsa*	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Toxolasma lividum*	Purple lilliput	N Fk Holston R, Clinch R	Aquatic-rivers.	S	G3Q	SH	-
1	-	X	*Villosa perpurpurea*	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Villosa trabalis*	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
1	-	X	*Microhexura montivaga*	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G2	S1	-
Amphipod (Crustacean, Order Amphipoda)										
1	-	X	*Stygobromus abditus*	James Cave amphipod	James, Sam Bells caves, Pulaski Co; Watsons cave, Wythe Co; and other New River caves.	Aquatic-caves, water well.	S	G3	S3	-
1	-	X	*Stygobromus emarginatus*	Greenbrier Cave amphipod	Greenbrier, Monroe Cos, WV	Aquatic-caves. In caves under gravel in streambeds, occasionally in pools. Most abundant in smallest trickles of water. Primarily in tiny first and second order headwater cave streams.	S	G3	-	S3
1	X	-	*Stygobromus gracilipes*	Shenandoah Valley cave amphipod	Frederick, Rockingham, Shenandoah, Warren Cos	Aquatic-caves.	S	G3G4	S3	S1
1	X	-	*Stygobromus hoffmani*	Alleghany County cave amphipod	Low Moor cave (not on FS), Alleghany Co	Aquatic-caves, groundwater habitats including springs and seeps.	S	G2	S2	-
1	X	-	*Stygobromus mundus*	Bath County cave amphipod	Alleghany, Bath Cos	Aquatic-caves.	S	G2G3	S1S2	-
1	-	X	*Stygobromus pollostus*	Least Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S1
1	-	X	*Stygobromus spinatus*	Spiny Cave stygobromid	Southern Monroe Co, north-northeast to central Pocahontas, Co, WV, primarily within the Greenbrier Valley. Covers a linear distance of ~67 miles.	Aquatic-caves. In gravels of small streams and in small cave pools.	S	G2G3	-	S2
Isopod (Crustacean, Order Isopoda)										
1	X	-	*Antrolana lira*	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren Cos, VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
1	-	X	*Caecidotea incurva*	Incurved cave isopod	McCullin Cave, Smyth Co; Groseclose Cave No. 1, Wythe Co	Aquatic-caves.	S	G2G4	S2	-
1	X	X	*Miktoniscus racovitzai*	Racovitza's terrestrial cave isopod	Alleghany, Botetourt, Page, Rockbridge, Shenandoah Cos	Aquatic-caves.	S	G3G4	S2	-
Crayfish (Crustacean, Order Decapoda)										
1	-	X	*Cambarus callainus*	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: *Cambarus veteranus*.	T	G2	S1S2	S1
Centipede (Insect, Order Chilopoda)										
1	X	X	*Escaryus cryptorobius*	Montane centipede	The Priest, Nelson Co; Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Upper soil horizon, spruce-birch forests.	S	G2	S2	-
1	-	X	*Escaryus orestes*	Whitetop Mountain centipede	Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Dark moist soil and litter, spruce-birch forests.	S	G1G2	S1S2	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
Springtail (Insect, Order Collembola)										
1	X	-	*Pygmarrhopalites sacer*	A cave springtail	Bath Co	Caves.	S	G2	S2	-
Dragonfly (Insect, Order Odonata)										
7	X	X	*Hylogomphus viridifrons*	Green-faced clubtail	New R, Craig Ck, Pound R, Locust Spring	Aquatic-rivers. Formerly: *Gomphus viridifrons*.	S	G3G4	S2	S3
7	-	X	*Ophiogomphus howei*	Pygmy snaketail	Upper New R; Carroll, Grayson, Wythe Cos	Aquatic-rivers.	S	G3	S1S2	-
Stonefly (Insect, Order Plecoptera)										
1	-	X	*Allocapnia fumosa*	Smokies snowfly	High elevation rheocrenes (flowing springs) of Mt. Rogers. Grayson, Smyth Cos.	Aquatic-streams.	S	G2	S1S2	-
1	-	X	*Megaleuctra williamsae*	Smokies needlefly	Mt Rogers & Whitetop Mtn	Aquatic-streams.	S	G2	S1S2	-
1	-	X	*Taeniopteryx nelsoni*	Cryptic willowfly	Lewis Fk & Grindstone Branch N of Mt Rogers	Aquatic-streams.	S	G1	S1	-
Beetle (Insect, Order Coleoptera)										
2	X	X	*Cicindela patruela*	Northern barrens tiger beetle	Blue Ridge, Ridge & Valley	Eroded slopes of exposed sandstone and conglomerate.	S	G3	S2	S2S3
1	-	-	*Pseudanophthalmus avernus*	Avernus Cave beetle	Endemic to Endless Caverns (commercial cave, non-FS) Rockingham Co.	Caves.	S	G1	S1	-
1	-	X	***Pseudanophthalmus cordicollis***	Little Kennedy Cave beetle	Franklins Pit, Little Kennedy Cave, Omega Cave System, Wildcat Saltpetre Cave, Wise Co., VA	Caves.	S	G1	S1	-
1	X	-	*Pseudanophthalmus intersectus*	Crossroads Cave beetle	Known only from Crossroads Cave, Millboro Springs, Bath Co.	Caves.	S	G1G2	S1	-
Scorpionfly (Insect, Order Mecoptera)										
1	-	X	*Brachypanorpa jeffersoni*	Jefferson's short-nosed scorpionfly	Sugar Run Mountain, Giles Co; Whitetop Mtn, Smyth Co.	Moist soil around seeps. Only known from high elevation. Larvae use short burrows in loose soil and moss.	S	G2	S1S2	-
Butterfly, Skipper, Moth (Insect, Order Lepidoptera)										
1	-	X	*Atrytone arogos*	Arogos skipper	Historic records, Blacksburg area. Caldwell Fields records need to be verified.	Relatively undisturbed grasslands, prairies, sand prairies, serpentine barrens, grassland/herbaceous, old field. Larval host plant; big bluestem *Andropogon gerardi.*	S	G3	SH	-
1	X	X	*Calephelis borealis*	Northern metalmark	Alleghany, Augusta, Bath, Botetourt, Craig, Lee, Montgomery, Russell, Scott Cos: Historic records from Giles, Rockbridge Cos.	Openings within forested or wooded areas, natural outcrops, shale or limestone barrens, glades or powerline right of ways. Larvae host plant; round-leaf ragwort, *Senecio obovatus.*	S	G3G4	S3	S1
1	X	X	*Callophrys irus*	Frosted elfin	Frederick, Montgomery, Page, Roanoke Cos.	Dry, open woods, clearings, and road/powerline ROWs with abundant wild indigo, *Baptisia tinctoria*.	S	G3	S2?	S1
11	X	X	*Danaus plexippus*	Monarch	Blue Ridge, Ridge & Valley	Mixed hardwood/conifer forest; shrubland; grassland/herbaceous; old field; suburban/orchard; cropland/hedgerow. Larval host plant; milkweeds *Asclepias* spp.	S	G4	S4	S2B
1	X	X	Erora laeta	Early hairstreak	Bedford, Botetourt, Page, Rockbridge, Warren, Wise Cos., VA; Monroe, Pendleton Cos., WV. Historic records from Giles, Montgomery Cos.	Hardwood forests or hardwood-northern conifer mixed forests. Larval host food, young fruit of American beech, *Fagus grandifolia*, nuts of beaked hazelnut *Corylus cornuta*. Canopy dweller.	S	GU	S2	S2
2	X	X	*Speyeria idalia*	Regal fritillary	Blue Ridge, Ridge & Valley	Riparian, grasslands-shrublands. Larval host plant, violets, *Viola* spp.	S	G3	S1	SH
1	X	X	*Erynnis martialis*	Mottled duskywing	Historic records from Augusta, Bedford, Botetourt, Craig, Montgomery, Rockbridge Cos.; St. Mary's R near entrance to Wilderness Area, Augusta Co.	Open woodland; barrens; open brushy fields. Larval host plant; New Jersey tea *Ceanothus americanus*.	S	G3	S1S3	S1
1	X	X	*Erynnis persius persius*	Persius duskywing	Blue Ridge, Ridge & Valley	Bogs, wet meadows, open seepages in boreal forests. Larval host plant; lupine, *Lupinus perennis*, wild indigo, *Baptisia tinctoria*.	S	G5T1T3	S1	-
1	X	-	*Pyrgus centaureae wyandot*	Appalachian grizzled skipper	Ridge & Valley	Shale barrens, open shaley oak woodlands. Larval host plant; cinquefoil, *Potentilla* spp, strawberry, *Fragaria virginina.*	S	G1G2Q	S1	S1
2	X	X	*Catocala herodias gerhardi*	Herodias underwing	Bald Knob, Bath Co; Poverty Hollow, Montgomery Co; Sand Mtn, Wythe Co (non FS property)	Pitch pine/bear oak scrub woodlands, >3000'. Larval host plant; oak, *Quercus* spp.	S	G3T3	S2S3	SU
1	-	X	*Catocala marmorata*	Marbled underwing	Montgomery Co	Mesic montane hardwood forests; Forested wetland, riparian. Larval host plants; willows/cottonwoods, *Salix/Populus*.	S	G3G4	S2	-
1	X	-	*Euchlaena milnei*	Milne's euchlaena moth	Warm Springs Mtn, Catawba Creek Slopes, Sweet Spring Hollow, Salt Pond Mtn. (Doe Creek)	Moist, forested slopes of mixed pine hardwoods. Acidic oak woods.	S	G2G4	S2	S1
Bee (Insect, Order Hymenoptera)										
10	X	X	*Bombus affinis*	Rusty-patched bumble bee	Bath Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	S1	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
NON-VASCULAR PLANT										
Lichen										
1	-	X	*Alectoria fallacina*	Witch's-hair lichen	Smyth, Grayson Co	S. Appalachian endemic. Conifer trees, especially fir rarely on birch, in spruce-fir forests; rarely fire cherry communities.	S	G2	SH	SNR
1	-	X	*Gymnoderma lineare*	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-
1	X	X	***Heterodermia appalachensis***	Appalachian shield lichen	St. Mary's Wilderness, Augusta Co.; Skidmore Fork, Rockingham Co.; Browns Run, Page Co.; rock outcrop, 6 mi. SE of Edinburg, Page Co.; summit of Whitetop Mt, Washington Co.	Bark of hardwoods, occasionally on shaded rocks.	S	G2?	S1	-
1	-	X	*Heterodermia erecta*	A foliose lichen	Along Whitetop access road, 1.2 mile from summit, Grayson Co., VA.	S. Appalachian endemic.	S	G1?	S1	-
1	-	X	*Hypotrachyna oostingii*	A foliose lichen	Mount Rogers, on Smyth, Grayson Co. line	Spruce-fir forests.	S	G2?	SU	-
1	-	X	*Hypotrachyna virginica*	Virginia hypotrachyna lichen	Mt Rogers & Whitetop Mtn	Spruce-fir forests. Found on spruce, fir, rhododendron in spruce-fir and fire-cherry communities in S. Appalachian Mtns. Typically at higher elevations, has been found at lower elevations.	S	G1G2	SH	SNR
1	-	X	*Lecanora masana*	A lichen	Whitetop Mtn, and Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir, northern hardwood-conifer forest.	S	GNR	-	-
1	X	-	*Melanelia culbersonii*	Culberson's Black-parmelia	Massanutten (Fridley watershed) Rockingham Co; along trail from Wolf Gap Campground to Big Schloss, Shenandoah Co.	Rocks in open areas and on talus slopes. Fully exposed, minimally weathered quartzite and sandstone boulderfields at elevations from about 1000-3300 ft.	S	G2	S4	-
Liverwort										
1	-	X	*Bazzania nudicaulis*	A liverwort	Mt Rogers & Whitetop Mtn	Bark and rock outcrops in spruce-fir forests.	S	G2G3	S?	-
1	X	-	*Cephaloziella spinicaulis*	A liverwort	Along SR 33, 10 miles W of Harrisonburg.	Damp soil in crevices of shaded sedimentary rocks, in hemlock-hardwoods forest and humid to dry faces of ledges and cliffs in open oak-hickory forest.	S	G3G4	SNR	-
1	-	X	*Leptoscyphus cuneifolius*	Wedge Flapwort	Grayson Co	Bark of Fraser fir.	S	G4G5	SH	-
1	-	X	*Nardia lescurii*	A liverwort	Blue Ridge, Ridge & Valley	Riparian - on peaty soil over rocks, usually in shade and associated with water, <3000'.	S	G3?	S1	-
1	-	X	*Plagiochila austinii*	A liverwort	Little Stony Ck – Cascades; Red Ck on Beartown Mtn	Rich, moist, densely forested ravines; shaded outcrops.	S	G3	S?	-
1	-	X	*Plagiochila corniculata*	A liverwort	Grayson, Smyth Cos	Limited to densely shaded, humid, often fog-enshrouded mountain summits, usually to the spruce-fir association. Most commonly found on Fraser fir.	S	G4?	SNR	-
1	-	X	*Plagiochila sullivantii var. sullivantii*	A liverwort	Whitetop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices.	S	G2T2	SNR	-
1	X	X	*Plagiochila virginica*	A liverwort	Bath, Giles, Highland, Roanoke Cos	S. Appalachian endemic. Damp to intermittently dry calcareous or sandstone ledges or cliffs in partially exposed sites.	S	G3	SNR	SNR
1	X	X	*Radula tenax*	A liverwort	Alleghany, Amherst, Dickenson, Giles, Highland, Nelson, Smyth, Washington Cos	Moist rocks or trees in mountains below spruce-fir zone; Depressed, dense mats on moist rocks, less frequently on tree trunks, in mountainous and hilly regions. Two discrete modes of occurrence: on shaded, damp rocks, and on tree bark in deep, moist forests. Does not tolerate submersion.	S	G3G4	SU	SNR
1	-	X	*Sphenolobopsis pearsonii*	A liverwort	Mt Rogers & Whitetop Mtn	Bark of Fraser fir, mountain ash, occasionally on red spruce, >5000'.	S	G2	S?	-
Moss										
1	-	X	*Sphagnum flavicomans*	Northeastern peatmoss	Whitetop Mtn	Bogs, seeps.	S	G3	SU	-
VASCULAR PLANT										
1	-	X	*Abies fraseri*	Fraser fir	Grayson, Smyth Cos	S. Appalachian endemic. Spruce–fir forests, bogs >5000'	S	G2	S1	SNA
11	X	X	*Aconitum reclinatum*	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages; all with high pH.	S	G3G4	S3	S3
1	-	X	*Actaea rubifolia*	Appalachian black cohosh	Lower Clinch R watershed, Scott, Wise Cos	Moist, rich wooded bluffs over limestone.	S	G3	S1	-
1	X	X	*Allium oxyphilum*	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	G2	S1	S2
1	X	-	*Arabis patens*	Spreading rockcress	Frederick, Lee, Page, Shenandoah, Warren Cos, VA; Hampshire, Hardy, Pendleton Cos, WV	Shaded, calcareous cliffs, bluffs, and talus slopes.	S	G3	S1	S2
11	X	X	*Berberis canadensis*	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows.	S	G3	S3S4	S1
1	-	X	*Betula uber*	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
1	X	-	*Boechera serotina*	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
1	X	-	*Boltonia montana*	Mountain doll's-daisy	Augusta Co	Sinkhole ponds.	S	G1G2	S1	-
1	-	X	*Botrychium jenmanii*	Alabama Grapefern	Russell & Wise Cos.	Open woods, old fields, pastures. Formerly: *Sceptridium jenmanii*	S	G3G4	SH	-
1	X	X	*Buckleya distichophylla*	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods.	S	G3	S2	-
1	-	X	*Cardamine clematitis*	Mountain bittercress	Blue Ridge, Ridge & Valley, S of New R watershed	Riparian, spring seeps, rocky streamsides.	S	G3	S1	-

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1	X	X	*Carex polymorpha*	Variable sedge	Blue Ridge, Ridge & Valley, N of James R	Open acid soil, oak-heath woodlands, responds positively to fire.	S	G3	S2	S1
1	X	X	*Carex schweinitzii*	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes.	S	G3G4	S1	-
1	-	X	*Chelone cuthbertii*	Cuthbert turtlehead	Blue Ridge Plateau, Grayson, Carroll Cos	Bogs, wet meadows, boggy woods and thickets.	S	G3	S2	-
1	-	X	*Cleistesiopsis bifaria*	Small spreading pogonia	Craig, Dickenson, Scott, Wise Cos	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils. Formerly: *Cleistes bifaria.*	S	G4?	S2	S1
1	-	X	*Clematis addisonii*	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone.	S	G1?	S2	-
1	X	X	*Clematis coactilis*	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands.	S	G3	S3	-
1	X	-	*Clematis viticaulis*	Millboro leatherflower	Endemic to VA, only in Bath, Rockbridge Cos.	Shale barrens, open shaly woodlands.	S	G1	S1	-
1	X	X	*Corallorhiza bentleyi*	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails.	S	G2	S2	S1
11	X	X	*Delphinium exaltatum*	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands.	S	G3	S3	S2
1	X	-	*Echinodorus tenellus*	Dwarf burhead	Pines Chapel Pond, Augusta Co	Pond margins, wet depressions in sandy soil.	S	G5?	S1	-
1	X	X	*Echinacea laevigata*	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
1	X	X	*Euphorbia purpurea*	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets.	S	G3	S2	S2
1	X	X	*Gaylussacia brachycera*	Box huckleberry	Alleghany, Bath, Bland, Carroll, Craig, Dickenson, Montgomery Cos	Dry, acidic forests, woodlands of oaks, pines, and other heaths.	S	G3	S1	S2
1	X	X	*Gymnocarpium appalachianum*	Appalachian oak fern	Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren Cos	Maple-birch-hemlock woods on mountain slopes and summits, moist sandstone, talus slopes, or bouldery colluvium. Requires cool, moist microclimate, typically on north-facing slopes with cold air seepage >2000'.	S	G3	S3	S2
1	X	-	*Helenium virginicum*	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
1	X	-	*Helonias bullata*	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-
1	X	-	*Heuchera alba*	White alumroot	Shenandoah Mtn	High elevation rocky woods and bluffs.	S	G2Q	S1	S2
1	X	X	*Ilex collina*	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'.	S	G3	S1	S2
1	-	X	*Iliamna corei*	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
1	X	X	*Isotria medeoloides*	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
2	X	X	*Juglans cinerea*	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests, mostly along toeslopes.	S	G4	S3?	S3
1	X	X	*Liatris helleri*	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings. *L.turgida* synonymous with *L. helleri.*	S	GNR	S3	SNR
1	-	X	*Lilium grayi*	Gray's lily	Blue Ridge, Mt Rogers & Whitetop Mtn (occurrences north of Floyd Co questionable).	Bogs, open seeps, wet meadows, grassy balds.	S	G3	S2	-
1	X	X	*Monotropsis odorata*	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	G3	S3	S1
1	-	X	*Packera millefolium*	Piedmont ragwort	Lee, Scott Cos	Open limestone outcrops and cedar barrens.	S	G3	S2	-
1	X	X	*Parnassia grandifolia*	Largeleaf grass-of-Parnassus	Augusta, Bland, Giles, Grayson, Lee, Montgomery, Russell, Washington, Wythe	Fens, thinly wooded, gravelly seeps over limestone, dolomite, amphibolite, and ultramafic rocks; restricted to calcareous or magnesium-rich soils.	S	G3	S2	S1
1	X	-	*Paxistima canbyi*	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream.	S	G2?	S2	S2
1	X	X	*Phemeranthus teretifolius*	Quill fameflower	Amherst, Augusta (west side of Blue Ridge, near Laurel Springs Gap, Humpback Mtn SBA), Bedford, Carrol, Craig (Bald Mtn SBA), Grayson, Montgomery, Nelson, Page, Roanoke, Rockingham, Warren Cos, VA; Hardy & Hampshire Cos, WV	Calcareous sandstone glades, metabasalt barrens. Also Roundleaf fameflower, *Talinum teretifolium*.	S	G4	S4	S1
11	X	X	*Phlox buckleyi*	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	G2	S2	S2
1	X	X	*Poa paludigena*	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade.	S	G3G4	S2	S1
1	X	-	*Potamogeton hillii*	Hill's pondweed	Bath Co	Clear, cold calcareous ponds.	S	G3	S1	-
1	X	-	*Potamogeton tennesseensis*	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers.	S	G2G3	S1	S2
11	X	X	*Pycnanthemum torreyi*	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	G2	S2	S1
1	X	X	*Scirpus ancistrochaetus*	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
11	X	X	*Scutellaria saxatilis*	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	G3G4	S3	S2
1	-	X	*Silene ovata*	Mountain catchfly	Dickenson, Lee, Wise Cos	Rich woodlands and forests over limestone.	S	G3	S1	-
1	-	X	*Spiraea virginiana*	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1
1	X	X	*Thermopsis mollis*	Soft-haired thermopsis	Amherst, Bath, Bedford, Botetourt, Montgomery, Rockbridge Cos	Dry, open forests, woodlands, and clearings. Also Allegheny Mountain Golden-banner.	S	G3G4	S3	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	X	*Trifolium virginicum*	Kate's Mountain clover	Alleghany, Augusta, Bath, Botetourt, Craig, Frederick, Highland, Rockbridge, Rockingham, Shenandoah, Warren Cos	Shale barrens.	S	G3	S3	S3
1	-	X	*Tsuga caroliniana*	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	G2G3	S3	-
1	X	X	*Vitis rupestris*	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock.	S	G3	S1	S2

LEGEND FOR TES SPECIES LIST IN OCCURRENCE ANALYSIS RESULTS:

OAR CODES:

1 = Project located out of known species range.
2 = Lack of suitable habitat for species in project area.
3 = Habitat present, species was searched for during field survey, but not found.
4 = Species occurs in project area, but outside of activity area.
5 = Field survey located species in activity area.
6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.
11 = Habitat present within project area, species known or suspected to occur in activity area. However, project design and mitigation measures result in no effect or no impact for this species, since activities will occur when species is either dormant or not in the project area due to time of year activities will occur, and/or activities will not impact habitat components species are known to utilize for their life cycle needs. (NOTE: When using this code, the Biological Evaluation or Biological Assessment should include an explanation of the analysis used. *E.g.*, How are the impacts of the action limited temporally to not cause an impact when the species returns or breaks dormancy?)

SPECIES: The term "species" includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here "range" is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.
G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.
G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.
GH = Formally part of the world's biota with the exception that may be rediscovered.
GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.
GU = Possibly rare, but status uncertain and more data needed.
G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).
G_G_ = The rank is uncertain, but considered to be within the indicated range (e.g., G2G4) of ranks (also T_T_).
G_Q = Taxon has a questionable taxonomic assignment, (e. g., G3Q) and may prove to be invalid upon further study.
G_T = Signifies the rank of a subspecies (e. g., G5T1 would apply to a subspecies of a species is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.)
GNR = A global conservation status rank has not been assigned to the species.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** – Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals in Virginia; or of some factor(s) making it especially vulnerable to extirpation in Virginia.
- **S2** – Very rare and imperiled with 6 and 20 occurrences or few remaining individuals in Virginia; or with many individuals in fewer occurrences; or of some factor(s) making it vulnerable to extirpation in Virginia.
- **S3** – Rare to uncommon in Virginia with between 21 and 100 occurrences; may have fewer occurrences if found to be common or abundant at some of these locations; may be somewhat vulnerable to extirpation in Virginia.
- **S4** – Common and apparently secure in Virginia, although it may be rare in parts of its range.

- **SH** – Formerly part of Virginia's fauna/flora with some expectation that it may be recovered; generally applies to species that have not been verified in Virginia for an extended period (usually > 15 years) amd for which some inventory has been attempted recently.
- **SX** – Believed to be extirpated from Virginia with virtually no likelihood of rediscovery.
- **SU** – Possibly rare, but status uncertain and more data needed. Currently unrankable, due to lack of information or due to substantially conflicting information about status or trends; often because of low search effort or cryptic nature of the element.
- **S#B** – Breeding status of an animal (primarily used for birds/butterflies) in Virginia; these species typically inhabit Virginia only during the breeding season.
- **S#B/S#N** – Breeding and non-breeding status of an animal (primarily used for birds) in Virginia, when they differ.
- **SNA** – A conservation status rank not applicable because the species is not a suitable target for conservation activities in Virginia (includes accidental species, transients, exotics etc.).
- **SNR** – A state conservation status rank has not been assigned to the species.

These ranks should not be interpreted as legal designations.